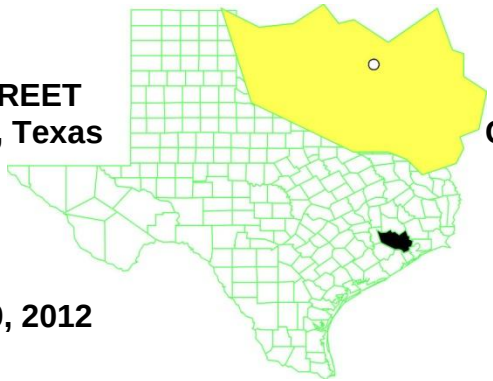
NORTH CAVALCADE STREET
Harris County (Houston), Texas
EPA ID# TXD980873343
Site ID: 0602956



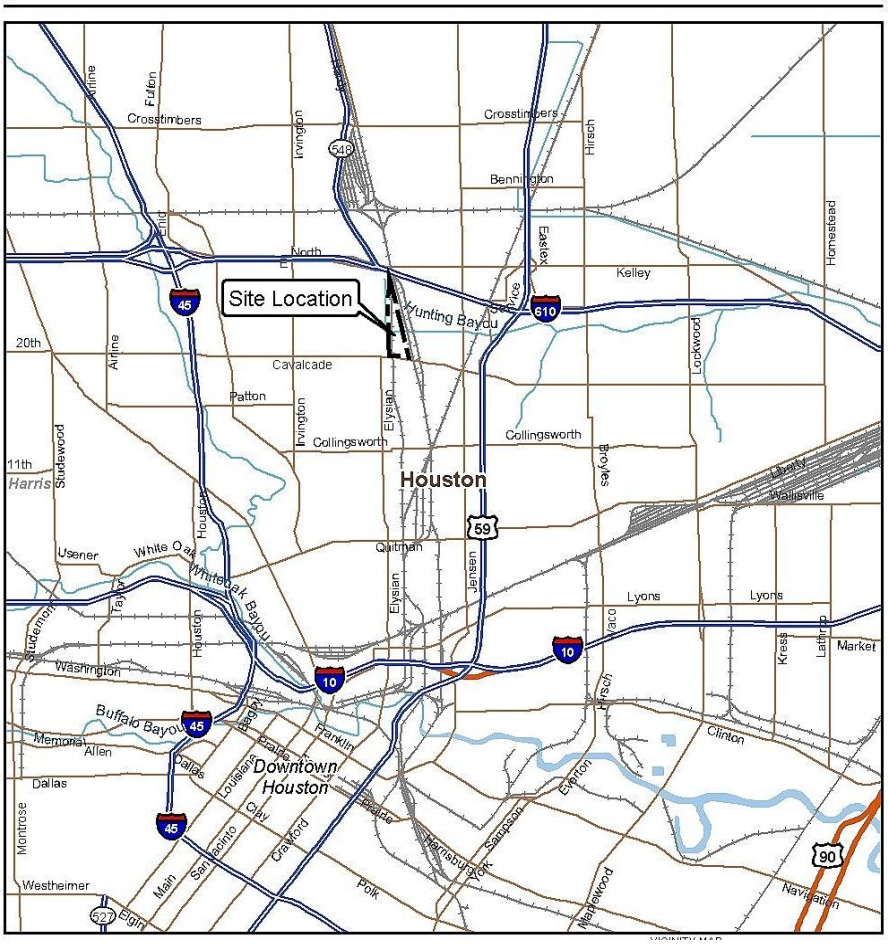
EPA Region 6
Congressional District 18

Contact:
Camille Hueni
214.665.2231

Last Updated: October 9, 2012

Background

The North Cavalcade Site is located northeast of the intersection of Cavalcade Street and Maury Street, about one mile southwest of the intersection of Loop 610 and U.S. Highway 59, in Houston, Harris County, Texas. The Site boundaries are Interstate Loop 610 to the north, Cavalcade Street to the south, and active rails on both the east and west boundaries. The Site is approximately 21 acres in size and has an elongated triangular shape. Residential areas are northeast and west of the site (as close as 200 feet from the site). Other surroundings include commercial and industrial properties. The South Cavalcade Superfund Site is located directly south of the North Cavalcade Street Site and was also a wood-treatment facility during the same time period. The two Sites were not otherwise related.



Location Map – Houston, TX

The North Cavalcade Site was developed for wood treating operations in 1946, when a small creosote wood preserving business named Houston Creosoting Company, Inc. (HCCI) was established. The wood preserving operations encompassed approximately nine acres on the southern portion of the property,

and included creosote ponds, various tanks and storage units, lumber shed, treatment facility, and other buildings. Wood preserving operations continued until 1961 when the property was foreclosed. In 1964, the property was sold; subsequent property owners further divided the property. There has been no further industrial activity on the Site since 1964. Data developed during the initial site investigation indicated that creosote stored in areas corresponding to the historical operation area and creosote lagoons contributed to the contamination. The former operation area and waste pits covered approximately one acre. There are two commercial businesses located in the southwestern section of the Site.

Current Status

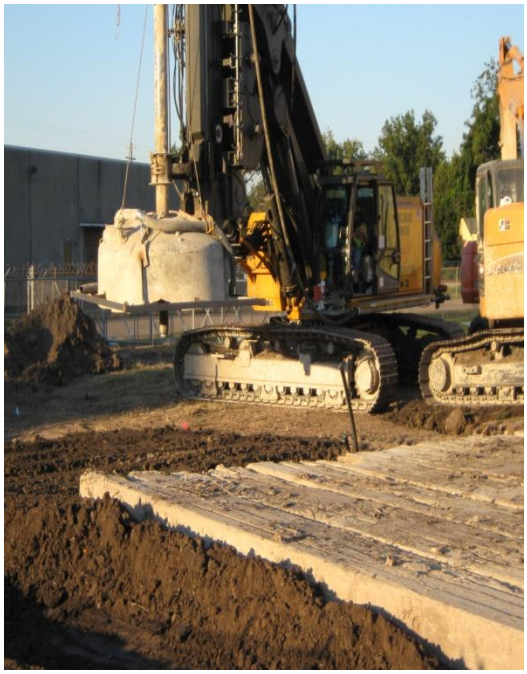
Record of Decision (ROD) Amendment Signed: On August 26, 2011, the EPA Region 6 signed a ROD Amendment to the initial 1988 ROD and the 2009 Amendment, which selected an alternate remedial action for two dissolved phase ground water contaminant plumes, associated with the shallow sand (Operable Unit1, or OU1) and the interbedded unit (OU3) creosote source areas for the Site. The selected remedy for the North Cavalcade Street Superfund Site implements a fundamental change to the previous decision documents for containment of the contaminant plumes, as restoration to cleanup levels will not be achievable throughout the impacted ground water. The selected remedy also establishes a Technical Impracticability Zone, within which cleanup levels are waived, and implements institutional controls to restrict use of, or access to, the contaminated ground water where concentrations exceed drinking water standards. A link to the 2011 ROD Amendment will be added to this Site Status Summary in the next few weeks and will also be added to the Administrative Record available at the two repositories referenced in the "*Community Involvement"* section. The ROD Amendment also includes a "Responsiveness Summary" to address the few questions posed at the July 19, 2011, public meeting. No further comments were received during the 30-day public comments period, July 8, 2011-August 6, 2011. More information is also available through the following links: Proposed Plan for the ROD Amendment and the Technical Impracticability Technical Memorandum.

Preliminary Close Out Report (PCOR) Signed: On August 31, 2011, the PCOR for the North Cavalcade Street Superfund Site was signed, which documents that the U.S. Environmental Protection Agency (EPA) has completed all construction activities at the Site in accordance with *Close Out Procedures for National Priorities List Sites*, May 2011 (EPA OSWER Directive 9320.2-22). This guidance supersedes the following documents: *Close Out Procedures for National Priorities List Sites*, January 2000 (EPA OSWER Directive 9320.2-09A-P); and the *Addendum to Policy for "Close Out Procedures for National Priorities List Sites,"* December 6, 2005 (OSWER Directive 9320.2-13). A pre-final inspection for the construction, implemented by the 2009 Record of Decision (ROD) Amendment was conducted on February 17, 2011.

The PCOR documents completion of the RA construction phase implemented by the 2009 ROD Amendment, addressing both ground water and soils. The 2011 ROD Amendment implements a containment remedy for two dissolved phase contaminant plumes and requires no additional construction. The final Site remedy has been constructed in accordance with the approved remedial design plans and specifications.

Construction of the Soil and Ground Water Remedy is Complete for the North Cavalcade Street Superfund Site: Construction of the physical remedial components of the soils and ground water remedy (September 2009 ROD Amendment) included completion of in-situ stabilization (ISS) of the two ground water source areas (October 16, 2010); placement and grading of final topsoil for the permanent cover for the soil cell and where the waste treatment plant was removed (February 14, 2011). Final site restoration activities (perimeter fence installation; hydro mulching; grading) were completed in March 2011. The ISS solidified 12,000 cubic yards (cy) of contaminated soil/source material in place at 220 columns; an additional 3,097 cy of swell was managed onsite; 4426 tons of excess swell and material was transported and disposed offsite. The permanent cover was constructed for the soil containment cell, which held 24,500 cy of soil. The Waste Treatment Plant, used to collect creosote and treat contaminated ground water for the 1988 selected remedy and has been discontinued, was demolished during this remedial action.

The pre-final inspection of the completed construction elements was held on February 17, 2011, and was attended by project managers from the U.S. Environmental Protection Agency (EPA), the Texas Commission on Environmental Quality (TCEQ), and the construction contractor, CH2M Hill.



The permanent ground water monitoring network was also completed in December 2010. The network includes 68 new and existing monitoring wells, installed both onsite and offsite, for both the target shallow and interbedded zones. The baseline ground water sampling in December included target semi-volatile and volatile organic analytes, as well as Monitored Natural Attenuation (MNA) parameters. A Stable Isotope Probing (SIP) study was also conducted for select monitoring wells to assess the natural degradation of naphthalene. The results of the baseline ground water sampling, the existing lines of evidence for MNA in ground water, and the line of evidence provided by the SIP analysis, are available in the Administrative Record at the Central Library in downtown Houston.

In-Situ Source Stabilization (2010)

Site Reuse Potential: The North Cavalcade Street Superfund Site is bounded by rail lines on both the east and west sides, by Cavalcade Street to the south, and Loop 610 to the north. The southern half of the site is privately owned, with two commercial businesses located on the western part of the property.

Nearing Completion on the Soil Cell Construction (2011)

The northern ten acres of the site is available for reuse now that the construction of the cap over the consolidated soils has been completed. Reuse of the northern section will be limited to those areas outside the cap and cell footprint. Currently, this property is only accessible through the southern half of the Site. The Harris County Toll Road Authority has plans to extend the Hardy Toll Road in the rail right-or-way along the Site's western boundary. Questions concerning reuse can be directed to Camille Hueni, at (214) 665-2231.

Benefits

The final remedy, selected in the 2011 ROD Amendment to address the two dissolved phase ground water contaminant plumes (Operable Units 1 and 3), is protective of human health and the environment. The Remedial Action Objectives (RAOs):

- Contain two ground water contaminant plumes, associated with the shallow sand (OU1) and the interbedded sand unit (OU3), through natural processes [*containment*];

- Prevent human exposure to contaminated ground water above acceptable risk levels by implementing institutional controls to restrict access to, or use of, contaminated water by restricting the installation of ground water wells within the designated Technical Impracticability (TI) Zone [*prevent exposure to contaminated ground water above acceptable risk levels*];

- Remove Site-related DNAPL accumulations in impacted monitoring wells until the amounts diminish and/or retrieval is no longer practicable [*source removal*].

The 2011 ROD Amendment addresses remaining ground water contamination associated with the former wood treatment facility at this Site, which was not completely remediated by actions taken under the initial 1988 ROD and the 2009 ROD Amendment.

The 2011 Selected Remedy:

- Establishes a containment remedy for the contaminated ground water associated with the shallow sand and the interbedded sand unit at the Site;

- Waives ground water cleanup levels, as Applicable or Relevant and Appropriate (ARARs), for benzene, benzo(a)pyrene, and naphthalene, within a 16-acre Technical Impracticability (TI) Zone, established by this Remedy;

- Provides for long-term monitoring to document the post-construction effectiveness of source stabilization to minimize the flux of contaminants to ground water, as well as to document the continued stability of the two contaminant plumes;

- Provides that DNAPL accumulations in the impacted monitoring wells will be periodically pumped for collection and disposal until the amounts diminish and/or retrieval is no longer practicable;

- Implements Institutional Controls (ICs) to restrict the use, or access to, contaminated ground water above health-based levels to ensure the continued protection of human health and the environment by restricting the installation of water wells within the designated TI Zone.

Response actions per the 2009 amendment to the 1988 ROD included actions to prevent long-term exposure to contaminated ground water; minimize the dense non-aqueous phase liquid (DNAPL) in the two impacted water-bearing units by in-situ stabilization, and eliminate exposure to contaminated soils and prevent and prevent impacts to ground water through infiltration of consolidated soils by constructing a permanent cover. The Construction Completion (August 31, 2011) for the Site refers to those remedial components implemented by the 2009 ROD Amendment; there are no further construction components associated with the 2011 ROD Amendment.

Since the selected remedy will result in hazardous substances remaining onsite above levels that allow for unlimited use and unrestricted exposure, a statutory review must be conducted within five years of the initiation of the initial remedial action to ensure that the remedy is, or will be, protective of human health and the environment. The Five-Year Review will be consistent EPA guidelines per CERCLA Section 121(c), 42 U.S.C. § 9621(c). The third five-year review, completed in September 2008, determined that conditions at the site were protective of human health and the environment, in the short term: contaminated soil is contained and is protected from access, and no is currently using the water from both shallow aquifers. The City of Houston provides drinking water onsite and to neighboring residences through their public drinking water system. The Third Five-Year Review report is available to the public at the information repository, located at the Houston Central Library, Government Documents Area, and 500 McKinney Street. The fourth five-year review is scheduled for completion by September 2013.

National Priorities Listing (NPL) History

NPL Inclusion Proposal Date:	October 5, 1984
NPL Inclusion Final Date:	June 10, 1986
HRS Score:	37.08

Population: The Site is located in an industrial/commercial corridor, but is flanked on the west and northeast by residential areas. It is estimated that 10,000 people live or work within a one-mile radius.

Setting: The North Cavalcade Site is located in the Southeast Texas Coastal Plain. This region is underlain with Holocene and Pleistocene deposits to a depth of approximately 2,400 feet. Ground water, used to supply water for domestic, industrial, and agricultural purposes, is pumped from the Lower Chicot and Evangeline aquifers. Both of these are confined aquifers and are isolated from surface recharge. Public water supply wells are screened in the Evangeline aquifer at depths greater than 600 feet. Industrial water users in the general area have wells screened in both aquifers at depths ranging from 50 to 576 feet.

Regionally, the topography slopes gently south toward the Gulf of Mexico. The site itself is generally flat. The Site is drained by three storm water drainage ditches, one of which bisects the site into northern and southern sections. This ditch drains into a flood control ditch which discharges into Hunting Bayou.

The two water-bearing zones, addressed by the Site remedy, are not used as sources of drinking water onsite or within a two-mile radius of the Site. Onsite and neighboring residents are served by the City of Houston water supply which originates from a deeper aquifer 10 miles from the site, or a surface water reservoir located over 20 miles from the site.

Hydrology: The impacted shallow sand and the underlying silty/clay unit extend from just below ground surface to approximately 40 feet. The first shallow aquifer is in a sand unit approximately 12 to 15 feet below ground surface; the interbedded sand aquifer is the interbedded silty sand/clay unit from about 25 to 40 feet below ground surface. Both units are hydraulically connected. The potentiometric surface data indicate ground water flow direction is to the west across the southern part of the site.

These two water-bearing units are underlain by a thick regional confining clay, approximately 100 feet thick, which serves as a barrier to continued downward migration of contaminants. The Pecore Fault, a local shallow fault with surface expression, runs along the southern boundary of the site and may control the southward migration of dense non-aqueous phase liquid (DNAPL) or contaminated groundwater to the south.

Principal Pollutants: Contaminants of concern for ground water and soils media include polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (benzene, ethylbenzene, toluene, and xylene), and limited metals with concentrations above background, associated with creosote-based operations. Pentachlorophenol, another wood treatment chemical constituent reportedly used at the site, has never been detected. Recent analysis of the

Wastes and Volumes

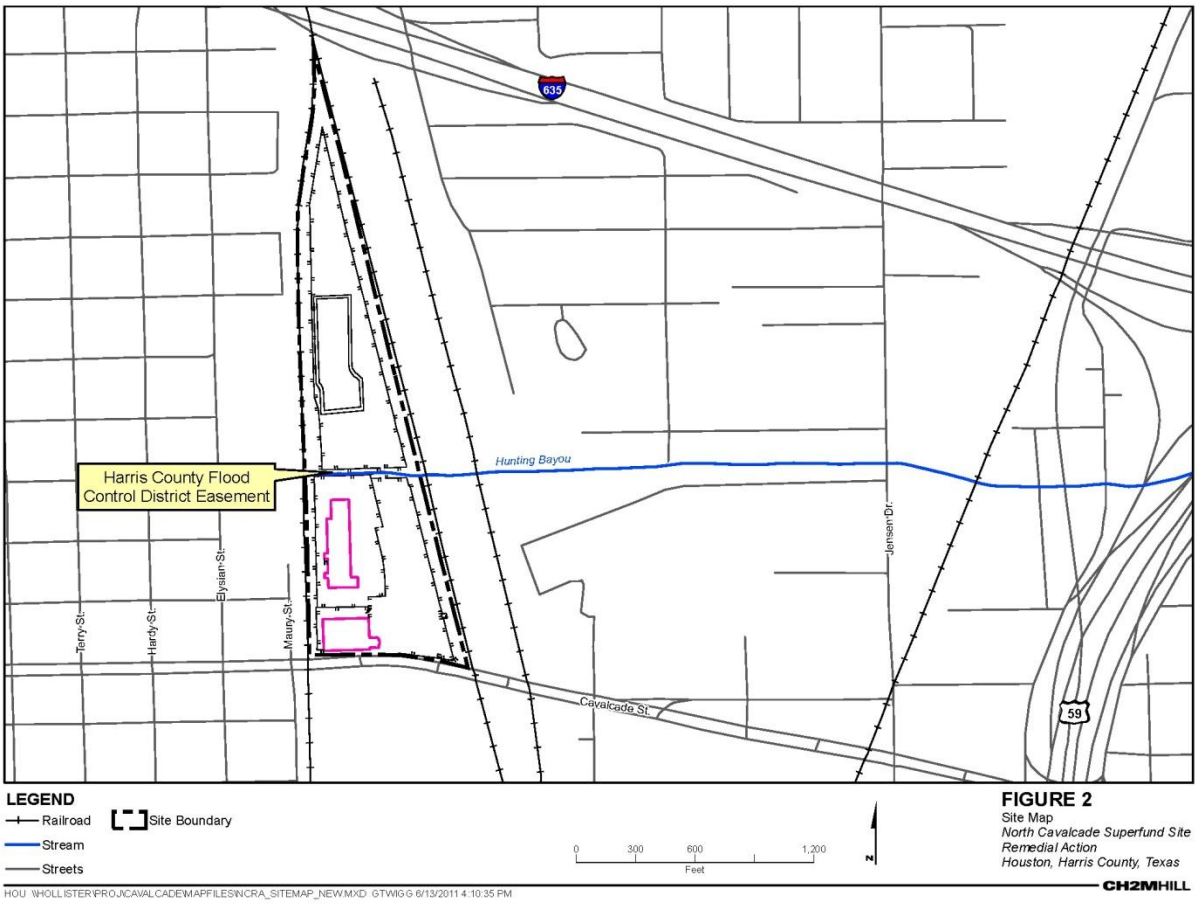
The pollutant at the North Cavalcade site is creosote, and its related constituents, in both soil and ground water. In the initial 1988 ROD, contaminants of concern (COCs) for ground water and soils were polycyclic aromatic hydrocarbons (PAHs), including naphthalene and benzo(a)pyrene, and volatile organic compounds (benzene, ethylbenzene, toluene, and xylene). As indicated in the 1988 ROD, metals were infrequently detected above background in soils (chromium, copper, lead, zinc) below ten feet and non-detect from surface to ten feet in depth. Metals were non-detect in ground water, with the exception of a single detection of arsenic. Benzene has not been detected in the post-treatment soils consolidated in the containment cell, and is no longer considered a COC for the soils.

During the recent construction of the selected remedy, an estimated 24,500 cubic yards of contaminated soils were placed within the permanent soil cell; an estimated 12,000 cubic yards of soil and creosote source materials were solidified in place at two locations; and 4,400 tons of swell/soils from the in-situ stabilization were removed from the site. Contaminated ground water associated with two source areas is present in two water-bearing units: the “shallow sand” and a fine-grained silt/clay “interbedded unit”.

Site Description and Maps

The following map shows the outline of the Site. The Site boundaries are Interstate Loop 610 to the north, Cavalcade Street to the south, and active rails on both the east and west boundaries. The Site is approximately 21 acres in size and has an elongated triangular shape. Residential areas are northeast and west of the site (as close as 200 feet from the site). Other surroundings include commercial and industrial properties. The South Cavalcade Superfund Site is located directly south of the North Cavalcade Street Site. The South Cavalcade Site was also a wood-treatment facility, but was not associated with the North Cavalcade Site.

The southern half of the site encompasses the former operations and waste pit areas of the old wood preserving facility. Data developed during the site investigation indicated that creosote stored in areas corresponding to the historical operation area and a creosote lagoon contributed to the contamination. The ground water remediation is limited to the southern portion of the site. An estimated 22,300 cubic yards of contaminated soils were removed from the historical operation area and are now contained in the soil cell (the footprint is outlined in the upper ten acres of the Site. The Harris County Flood Control District drainage ditch divides the Site into two ten-acre parcels and drains to Hunting Bayou. The two onsite commercial buildings are located in the southern part of the property and indicated by the highlighted area.



North Cavalcade Street Site Map

Ground water contamination at the North Cavalcade Street site is present in the dissolved-, residual-, and free-phase in both the shallow sand aquifer and the interbedded unit. The lateral extent of the shallow sand and interbedded unit dissolved phase plume has been sufficiently delineated in all directions. The dissolved phase plume in the shallow sand aquifer extends from two source areas towards the west. The majority of the dissolved plume residing in the shallow sand aquifer is located within the boundary of the

site. Benzene contamination in the shallow sand aquifer has not migrated offsite at concentrations greater than the drinking water standard of 5 parts per billion (ppb). The dissolved phase plume in the interbedded unit is more extensive than in the shallow sand and has migrated off the western boundary of the site at concentrations greater than 5 ppb for benzene.

The permanent monitoring well network, installed and sampled in December 2010, provides a post-construction baseline of dissolved phase contaminants for the Site. The map below shows the two source areas for the Site's naphthalene contaminant plume for the shallow and deeper interbedded units: one is located due east of the Coastal Casting Building, while the larger source area is closer to the eastern boundary of the Site. The non-detect (ND) line for naphthalene is the western extent of ground water contaminants related to the Site. The 490 ppb contour coincides with the residential clean-up level for naphthalene in ground water. The area outside this contour meets that cleanup standard. Similar maps have also been developed for naphthalene in the shallow sand, and benzene for both the shallow and interbedded sands and are available in the Administrative Record, which supported the 2011 ROD Amendment.

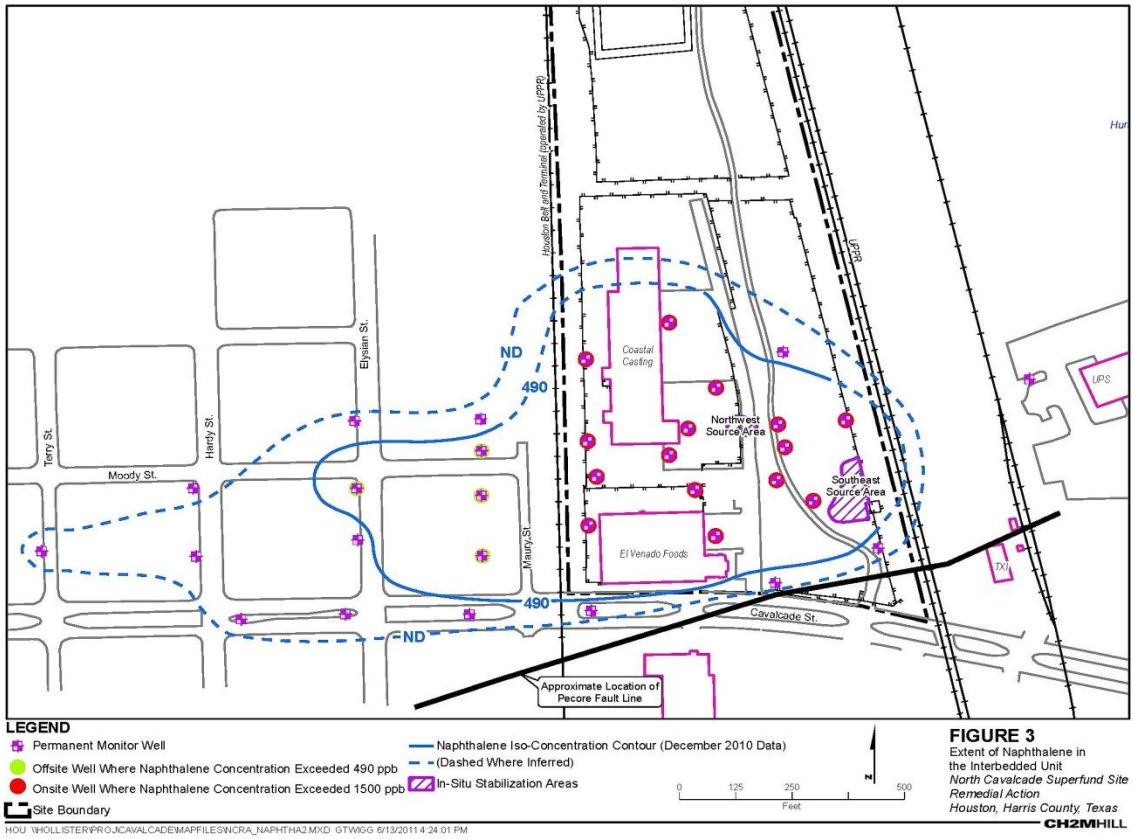


FIGURE 3
Extent of Naphthalene in the Interbedded Unit
North Cavalcade Superfund Site
Remedial Action
Houston, Harris County, Texas
CH2MHILL

Interbedded - Naphthalene Extent

Health Considerations

The 1988 Record of Decision considered that both surface soils and ground water were contaminated. Contaminated soils were treated but failed to meet the recommended 30 ppm cleanup level for carcinogenic polycyclic hydrocarbons, and were consolidated on the upper ten acres of the site. Construction of a permanent cover was completed earlier this year, effectively containing and covered the impacted soils, and eliminating any potential risk to human health. The nearest water well (industrial use) is located 1500 feet up-gradient from the site. The two shallow water-bearing units underlying the southern section of the Site are contaminated with creosote-related constituents. However, the shallow

water is currently not being used as a drinking water source for the site or the down-gradient neighborhood. The City of Houston provides drinking water through their municipal drinking water system.

The 2008 Human Health Risk Assessment provides a detailed assessment of onsite and offsite risk, if the contaminated ground water is ever used as a potable source of water. That information is summarized in the 2009 ROD Amendment.

Record of Decision

The Record of Decision (ROD) for the Site, signed June 28, 1988, selected a remedy which included biological degradation of soil contaminants, and the extraction and treatment of ground water, utilizing oil/water separation and carbon absorption processes. This remedy provided for protection of human health eliminating unhealthy exposure to contaminated soil and ground water.

On August 8, 1994 EPA approved an Explanation of Significant Differences (ESD) to raise the soil cleanup criteria for carcinogenic polycyclic hydrocarbons (cPAHs) from 1 to 30 parts per million (ppm). The cleanup level was set at 30 ppm after a 1992 field pilot failed to demonstrate that bioremediation would reduce the cPAH concentration to below 1 ppm. As explained in the ESD, the 30 ppm cleanup level for soils would continue to meet or exceed the human health protection objective of the 1988 decision.

The 1988 ROD and 1994 ESD were amended in September 2009, which re-selected the remedy for both soils (containment and capping) and ground water contaminant source areas (in-situ solidification). Construction of the soil and ground water remedy was completed earlier this year. A pre-final inspection for the construction, implemented by the 2009 ROD Amendment, was conducted on February 17, 2011.

The 2011 ROD Amendment, signed August 26, 2011, considered the recent accumulation (April 2011) of creosote-related Dense Non-Aqueous Phase Liquid (DNAPL) in four of the Site's monitoring wells, but also information which demonstrated plume stability. The remedy selected containment of the shallow sand and interbedded unit dissolved phase plumes, as restoration throughout the impacted ground water would not be achievable in the presence of DNAPL. The decision established a 16-acre Technical Impracticability Zone, wherein cleanup levels would be waived for benzene, benzo(a)pyrene, and naphthalene. Institutional controls will be established to restrict the installation of ground water wells within this zone to prevent exposure to contaminants. Note that drinking water is provided by the City of Houston's public water supply in this area.

Community Involvement

The U.S. Environmental Protection Agency (EPA) recently held a public meeting, on July 19, 2011, to announce the Proposed Plan to change the ground water remedy for contaminated ground water associated with the Site. The 2011 ROD Amendment, signed August 26, 2011, includes a "Responsiveness Summary" to address the few questions posed at the public meeting. No further comments were received during the 30-day public comments period, July 8, 2011 - August 6, 2011.

Questions concerning the recent ROD Amendment, or pertaining to future actions for the North Cavalcade Street Superfund Site, can be addressed to Ms. Camille Hueni, Remedial Project Manager, U.S. EPA, Region 6, 1445 Ross Avenue (6SF-RA), Dallas, Texas 75202, or email hueni.camille@epa.gov or at 214-665-2231.

The 2011 Record of Decision Amendment and the supporting documents for the decision (Administrative Record) will be available soon at the following Site repositories and on EPA's public web page: http://www.epa.gov/earth1r6/6sf/6sf-decisiondocs.htm.

The repositories for the Site are:

Houston Public Library
Houston Metropolitan Research Center
500 McKinney

Houston, Texas 77002
Hours:
Monday, Tuesday, Thursday, 10:00 am-6:00 pm
Wednesday, 10:00 am – 8:00 pm
Saturday, 10:00am to 5:00 pm
Closed on Fridays and Sundays

Texas Commission on Environmental Quality
Building E, Records Management, First Floor
12100 Park 35 Circle
Austin, Texas 78753
(512) 239-2920
Hours: *Monday – Friday – 8:00 am to 5:00 pm*

Anyone who wishes to be placed on the mailing list to receive information about the Site is encouraged to call Bill Little, EPA Community Involvement Coordinator for the North Cavalcade Street Superfund Site, at 214-665-8131 or 1-800-533-3508 (toll-free).

Constituency Interest: No formal citizen groups or organizations are affiliated with this Site; the North Cavalcade Street Superfund Site is generally considered a low profile Site.
A demand exists for Spanish translations of fact sheets and informational materials.

Technical Assistance Grant (TAG): There is currently no TAG for this Site.

Site Contacts

EPA Remedial Project Managers	Camille Hueni	214-665-2231
EPA Community Involvement Coordinator	Bill Little	214-665-8131
EPA Site Attorney	Joseph Compton	214-665-8506
EPA Public Liaison	Donn R. Walters	214-665-6483
TCEQ Project Manager	Marilyn Long	512-239-0761
EPA Superfund Region 6 Toll Free Number	1-800-533-3508	

Information Repository

Houston Public Library
Houston Metropolitan Research Center
500 McKinney
Houston, Texas 77002

Texas Commission on Environmental Quality
Building E, Records Management, First Floor
12100 Park 35 Circle
Austin, Texas 78753